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| 10/004,170 | 10/30/2001 | Louis B. Rosenberg | IMM1P027B | 1999 |

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| EXAMINER | |
|---|---|
| BRIER, JEFFERY A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2672 | 38 |

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 10/004,170 | Applicant(s) ROSENBERG ET AL. | |
|---|---|---|---|
| | Examiner Jeffery A. Brier | Art Unit 2672 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *8/19/03 & 10/21/03* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *53,55,56,61 and 66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *53,55,56,61 and 66* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *9 & 19* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/19/03 has been entered.

2. The terminal disclaimer filed on 6/20/03 overcomes the obvious type double patenting rejections.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 53, 55, 56, 61 and 66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 53:

At line 5 "the selectively filtering the sensor data including filter the sensor data" lacks antecedent basis in the claim since selectively filtering was not claimed previously. Lines 4-7 needs to be rewritten to clearly claim the filtering being performed. Lines 4-5 seems to claim a first filtering while lines 6-7 claim a second filtering while the

specification at pages 21-25 seems to describe using one type of filtering selected from among several types.

Claims 55 and 56:

These claims have the same problems identified for claim 53.

Claim 61:

At line 8 "the disturbance filter process" lacks antecedent basis in the claim. Lines 4-8 seems to claim a first filtering while lines 8-9 claim a second filtering (including does not exclude other filtering) while the specification at pages 21-25 seems to describe using one type of filtering selected from among several types.

Claim 66:

At line 6 "the filter" lacks antecedent basis in the claim.

A prior art rejection of claims 53, 55, and 56 cannot be made because the metes and bounds of the claims are not definite. Thus, an indication of allowability would be premature.

### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 61 and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by the article by P.J. Berkelman and R.L. Hollis S.E. Salcudean titled Interacting with Virtual Environments using a Magnetic Levitation Haptic Interface published in International Conference on Intelligent Robots and Systems [IROS] '95, Pittsburgh, August, 1995. In section 3 this articled states *Digital state estimators were implemented to filter the sensed position data and provide smooth velocity data. Each control axis was assumed to be independent and was modeled as pure inertia from the dynamic response of the device. A more sophisticated estimator formulation was proposed in [15], in which external forces are estimated and corrected using the position errors.* In section 5 this article states *Tuning the digital estimator gains involves a tradeoff between output smoothness and the disturbance response. Since disturbances result mainly from the motions and forces of the user's hand and have limited bandwidth, the estimator gains were chosen to filter frequencies above approximately 25 Hz. The plant model used only the flotor inertia; damping from eddy currents and the user's hand were regarded as disturbances. Position data and estimator outputs with a sinusoidal disturbance are shown in Fig.4.*

A detailed analysis of the claims follows.

Claim 66:

Berkelman teaches an apparatus (*modified magic wrist section 1 paragraph 4, haptic wrist section 3, Maglev Wrist figure 1*) comprising:

an actuator configured to receive a haptic-feedback signal ( *section 3 describes the haptic wrist which states We are currently using a magnetically levitated fine-motion wrist shown in Fig.1 as a haptic interface [2, 14]. The wrist consists of a flotor, a a hexagonal box structure containing flat copper coils and positionsensing photodiodes, and a stator, a rigid support structure with mounted magnet assemblies and three narrow-beam LED's. To enable the user to manipulate the wrist easily, a ball grip was attached on top of the flotor. The flotor is stably levitated by driving controlled currents through the coils, producing Lorentz forces with the magnetic fields. The position and orientation of the flotor is calculated from the x; y positions of the LED spots on the photodiodes. Position and velocity feedback control in cartesian coordinates is used to control the dynamic impedance of the levitated flotor. A feedforward term cancels the weight of the flotor.*), the actuator configured to produce haptic feedback based on the haptic feedback signal (*section*

*1 describes In order for humans to interact more effectively with computers, the capability of humans to use various types of sensory data must be exploited. One means is by haptic perception of forces and torques on a user's hand while interacting with an artificial environment. Rendered graphics and virtual reality displays can generate realistic appearances of simulated environments, but do not enable the virtual world to be felt or manipulated directly. An ideal haptic interface would give a computer user the ability to feel, grab, and manipulate virtual objects. The dynamic reactions of objects in the simulated world would be instantly transmitted to the hand of the user as the motions or forces of the user's hand are sampled by the interface.*);

a sensor coupled to the actuator (*the first paragraph of section 3 describes the haptic wrist which is has a box with with photodiode sensors and flat copper coils which produce a magnetic field to produce haptic feedback, this is the actuator*),

the sensor configured to detect movement of the sensor (*photodiodes are mounted on the flotor to sense light from three narrow beam LEDs, as the flotor moves the location of the three narrow light beams will change, thus, the photodiode sensors detect movement*

*of themselves relative to the LEDs*), the sensor being configured to receive a command from a host computer in communication with the sensor (the sensor is more than the photodiodes, the sensor includes the electronics for processing the sense narrow LED light beams, thus the digital state estimator described in the second paragraph of section 3 is an integral part of the sensor, in section 5 paragraph 6 the digital estimator is described as being tuned, section 3 paragraphs 3 and 4 the digital estimator is described as being in the control system which is in communication with a Sun3 host workstation, since the components described forming the control system are programmable components then these components are in communication with the host to receive programming commands from the host) to activate the filter (*this claimed limitation is broad and is met by the host comnputer programming the control system to tune the digital estimator*); and

a filter configure to receive sensor data from the sensor (*the digital estimator is a filter*) and to provide input data to an associated graphical environment based on the haptic-feedback signal (*see section 1 Introduction*).

Claim 61:

This claim does not selectively apply the filter only during haptic feedback.

Berkelman teaches a method, comprising:

Receiving a haptic-feedback signal (*section 1 describes In order for humans to interact more effectively with computers, the capability of humans to use various types of sensory data must be exploited. One means is by haptic perception of forces and torques on a user's hand while interacting with an artificial environment. Rendered graphics and virtual reality displays can generate realistic appearances of simulated environments, but do not enable the virtual world to be felt or manipulated directly. An ideal haptic interface would give a computer user the ability to feel, grab, and manipulate virtual objects. The dynamic reactions of objects in the simulated world would be instantly transmitted to the hand of the user as the motions or forces of the user's hand are sampled by the interface.*) at a haptic-feedback device (*modified magic wrist section 1 paragraph 4, haptic wrist section 3, Maglev Wrist figure 1*);

outputting haptic-feedback based on the haptic-feedback signal (*see section 3 Haptic Wrist*);

Filtering sensor data (*see section 3 second paragraph and section 5 paragraph 6*) to produce input data according to a disturbance filter process (*any*

*filter that filters the sensed position data reduces disturbances present in the sensed position data*) associated with the haptic-feedback (*at least some haptic feedback will be above the 25HZ filter described section 5 paragraph 6*), the sensor data being based on a movement of the haptic-feedback device during the outputting of the haptic-feedback (*this filter will work during haptic feedback and no haptic feedback*), the filtering of the input data operative to reduce visual disturbance in the associated graphical environment caused by the output of the haptic-feedback (*inherently filtering when there is haptic feedback will reduce the visual disturbances caused by the haptic feedback being sensed by the sensors*), the disturbance filter process including modifying the sensor data by time-averaging the sensor data (*the filtering described in section 3 second paragraph is time based and effectively time averages the position signal, note the claimed limitation time averaging is a very broad term*); and

updating the associated graphical environment based on the input data (*new input data update the graphical environment*).

**Prior Art**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**8.** Richard M. Voyles, Jr., Gary Fedder, and Pradeep K. Khosla titled Design of a Modular Tactile Sensor and Actuator Based on an Electrorheological Gel published in In Proceedings of the 1996 IEEE International Conference on Robotics and Automation, Minneapolis, MN, April 1996, on page 16 second column this article states *We should pause, briefly, and examine the nature of the "actuation." An electrorheological fluid only has the ability to change viscosity and even develope yield stress. It has no capacity to actively exert forces on stationary objects. The only way the user can detect a change is by exerting a force on the tactor. For our application, observing a human demonstration, this is not a problem because the user is actually performing a contact task and is exerting forces. Keep in mind we intend to use the sensor/actuator pair as an active filter to control the feedback the human receives.*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A. Brier whose telephone number is (703) 305-4723. The examiner can normally be reached on M-F from 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (703) 305-4713).

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

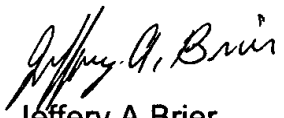
Washington, D.C. 20231

**or faxed to:**

**(703) 872-9306 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.



Jeffery A Brier
Primary Examiner
Art Unit 2672